

REMARKS

In the Final Office Action, claims 1-20 were rejected. All pending claims are believed to be clearly allowable. Reconsideration and allowance of all pending claims are requested.

Rejections Under 35 U.S.C. § 103(a)

Independent claims 1, 12 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Emery (U.S. Patent 6,624,547, hereinafter "Emery") in view of Clifton et al. (U.S. Patent 5,731,645, hereinafter "Clifton").

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Applicants respectfully re-assert that the present invention, as recited in independent claims 1, 12 and 13 is patentable over Emery in view of Clifton.

Independent claims 1 and 12:

Independent claims 1 and 12 are clearly distinguishable from the teachings of Emery and Clifton, alone or in combination. In particular, Emery does not teach, disclose or suggest at least "a series of serially connected turns formed by litz wire having a plurality of strands", as recited in claim 1 or at least "a series of serially connected turns formed by litz wire having a plurality of strands", as recited in claim 12. Clifton merely describes a litz wire in connection with reducing skin effect or eddy current losses, in column 8, lines 39-55:

One such wire, known as litz wire, is constructed of individual film-insulated wires which are bunched or braided together in a uniform pattern of twists and length of lay (thus, a coil formed of litz wire has at least one set of conductors that are parallel to each other coupled together in series with at

least one other set of parallel conductors). This configuration reduces *skin effect power losses* of solid conductors, or the tendency of high frequency current to be concentrated at the conductor surface. Properly constructed litz wires have individual strands each positioned in a uniform pattern moving from the center to the outside and back within a given length of the wire. In addition to the reduction of skin effect losses, litz wire and other multi-strand bundles of small gauge wire produce dramatically *lower eddy current losses* than a single strand of larger gauge wire. (Emphasis added.)

Independent claims 1 and 12 require a particular conductor structure and the use of litz wire. The application makes clear that the inventors recognized that litz wire and its use for reducing the AC losses was known in prior art.

The *litz wire* forming coil 210, as known in the art, includes a plurality of individual strands 230 including lightly insulated wires wound or twisted together in a pattern, in particular embodiments a uniform pattern. The strands are transposed in a specific configuration to *reduce AC losses, as known in the art*. The multi-strand configuration minimizes power losses otherwise encountered in a solid conductor due to what are commonly known as the “*skin and proximity effects*”. See, Application, paragraph 25 (emphasis added).

However, additionally, in the particular conductor structure claimed in independent claims 1 and 12, “*providing heat transfer from the respective individual strands to the at least one cooling tube*”, the heating can be minimized and additional benefits can be obtained by the use of litz wire. The references do not suggest or motivate the modification of either.

The references do not reasonably support a suggestion or motivation for the substitution proposed by the Examiner.

The Examiner's position is essentially that one skilled in the art would have been motivated to replace the conductor of Emery with litz wire as discussed in Clifton. Neither of the references supports that position.

First, regarding Clifton, the Examiner relied upon the reference merely for its teachings regarding turns made of litz wire. Applicants do not deny that the reference generally discusses litz wire. Applicants also point out that litz wire, as acknowledged by the passage from the application discussed above, was clearly known prior to this invention. However, litz wire had never been used in the manner claimed. Certainly, nothing in Clifton would prompt its use in a winding of the type defined by claims 1 and 12.

Emery, on the other hand, adopts a completely different solution to a multi-conductor winding. Emery utilizes copper strands 22 in lieu of the litz wire. In Emery, increase in cooling effectiveness is provided by reducing the potential difference between the cooling tubes 30 and copper strands 22, via capacitive coupling. This multi-strand approach, then, is specifically adopted to provide capacitive coupling and thereby to reduce potential differences between the coils and the vent tubes. *See*, Emery, column 3, line 37 – column 4, line 14. Applicants submit that there is no reasonable basis for believing that litz wire would or even could capacitively couple in this manner. Under MPEP section 2143.01, sub-section V, it is stated that “if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” Thus, the Examiner must demonstrate not only Emery’s copper strands could be replaced by litz wire, but that there is some reasonable basis for believing it would function successfully.

Moreover, any gain in flexibility or current-carrying capacity (e.g., due to skin effect) obtainable with litz wire would presumably be provided by the multiple strands taught by Emery. Thus the apparatus in Emery *already* reduces the eddy current losses, so there is no motivation to combine Emery with Clifton for any further reduction in the eddy current losses as taught by Clifton, since the Emery reference already performs the function. As such, there would be no reason whatsoever for making the substitution of Clifton’s litz wire in Emery’s windings, except in an effort to follow the recitations of the claims.

At the very least, neither Emery nor Clifton provide any reasonable basis for the combination. According to MPEP 2143.01, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. That is not the case here. Further, under MPEP 2143.01, it is stated that there are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. None of these reasons are present in case of Emery and Clifton in order to support this combination.

In summary, there is no rational reason to combine the teachings of Emery and Clifton, because one skilled in the art would not use litz wire or a series of serially connected turns instead of copper strands 22 to increase cooling effectiveness, via capacitive coupling. Furthermore, replacing copper strands 22 with litz wire may change the operation of the system disclosed in Emery, because capacitive coupling may not be achieved in such a case. Therefore, one skilled in the art would not be motivated to use the litz wire instead of copper strands 22.

Accordingly, Applicants respectfully submit that independent claims 1 and 12 and the claims depending therefrom are allowable and respectfully request the Examiner to reconsider the rejection of the claims.

Independent Claim 13:

In the Office Action, the Examiner rejected claim 13 in view of Emery and Clifton. The Examiner observed that Emery does not disclose serially connected turns, but argued that Emery does provide teachings for the remainder of the recitations of claim 13. The Examiner relied on Clifton for teaching serially connected turns.

Applicants observe that, here again, there is no reasonable basis for the combination of Emery and Clifton. In particular, any such combination would essentially be counter to

the reasonable interpretation and solutions taught by both references. More particularly, Emery teaches a technique for cooling a rotating machine by the use of vent tubes. Clifton, quite the contrary, teaches the reduction in heat generation in a machine by the use of flywheels.

The arrangement recited in claim 13 is intended to remove heat in two manners. As pointed out in paragraph 28 of the application, a majority of the heat transferred from the turns 211-218 occurs by way of heat flow along the individual strands 230 in a longitudinal direction. That is, heat flows along the longitudinal axis of the individual strands. Heat also is transferred from the respective individual strands 230 by formation of the cooling tubes.

Emery clearly relies only upon the vent tubes 30 for removal of heat. No mention whatsoever can be found in Emery for any other mode of heat transfer.

Clifton, on the other hand, discusses minimization of heat generation, and not heat transfer either along individual strands or from individual strands to cooling tubes. *See*, Clifton, column 11, lines 40-52.

Clearly, the references cannot be reasonably combined. That is, there would be no reasonable expectation that vent tubes of the type taught by Emery would have any purpose in the Clifton machine, where heat generation is minimized by the use of flywheels. Conversely, upon reading Emery, one skilled in the art would not be led to make the replacement of the coils of Emery with those of Clifton for heat removal purposes. Indeed, such replacement would entirely change the structure and, it is believed, would change the electrical nature of the operation of the Emery generator.

Because the teachings of Emery and Clifton cannot be reasonably combined, claim 13 is clearly allowable. That is, Emery and Clifton cannot be combined to render obvious

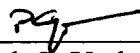
the use of serially connected AC bars that include cooling tubes through which a cooling medium flows. Reconsideration and allowance of claim 13 and of the claims depending therefrom are therefore respectfully requested.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Date: 1/30/2006



Patrick S. Yoder
Reg. No. 37,479
FLETCHER YODER
P.O. Box 692289
Houston, TX 77269-2289
(281) 970-4545